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IS 3742 (1990): Medical Glass Instruments - Pipettes,
dilution for haemocytometers [MHD 12: Hospital Equipment]

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भारतीय मानक

चिकित्सीय काँच उपकरण — हीमोसाइटोमीटर के लिए
पिपेट, तनुकरण — विशिष्ट

(दूसरा पुनरीक्षण)

Indian Standard

MEDICAL GLASS INSTRUMENTS — PIPETTES,
DILUTION FOR HAEMOCYTOMETERS —
SPECIFICATION

(*Second Revision*)

UDC 616.155-076 : 542.395 [666.172.7] : 531.732

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Medical Instruments and Disposables Sectional Committee, MHD 12

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards on 20 March 1990, after the draft finalized by the Medical Instruments and Disposables Sectional Committee had been approved by the Medical Equipment and Hospital Planning Division Council.

This standard was first published in 1966 and revised in 1980 to incorporate the test for permanency of marking. Second revision of this standard has been taken up to align its requirements with the International recommendations for Haemocytometer dilution pipettes, issued by the International Organization of Legal Metrology (OIML). Two classes of accuracy have been introduced based on the permissible limits specified in 7.2. The provision of mouth piece and connecting tube for the dilution pipettes has been made optional.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

MEDICAL GLASS INSTRUMENTS — PIPETTES, DILUTION FOR HAEMOCYTOMETERS — SPECIFICATION

(Second Revision)

1 SCOPE

1.1 This standard specifies dimensional and other requirements for dilution pipettes for haemocytometers.

2 REFERENCES

2.1 The Indian Standard IS 1382 : 1981 'Glossary of terms relating to glass and glassware (*first revision*)' is a necessary adjunct to this standard.

3 TYPES

3.1 Dilution pipettes shall be of the following two types:

- a) Pipettes, dilution for red blood corpuscles (1 in 100 dilution) also known as RBC pipette.
- b) Pipettes, dilution for white blood corpuscles (1 in 10 dilution) also known as WBC pipette.

3.2 The pipettes are classified for the purpose of accuracy as Class A and Class B pipettes.

4 MATERIALS

4.1 The pipettes shall be made from clear or enamel backed glass capillary tubing, free from visible defects and reasonably free from internal stresses. The glass shall be of suitable chemical and thermal properties.

4.2 The red and white beads shall be made from glass or ceramic of appropriate quality. The mouth piece and tubing, if supplied along with the pipette, shall be made as follows:

- a) Mouth piece of poly-propylene material
- b) Tubing of rubber or transparent plastics material, non-collapse under mouth suction and 200 to 230 mm in length.

5 SHAPES AND DIMENSIONS

5.1 The pipettes shall consist of a glass capillary tube of uniform bore, with a blown bulb

as shown in Fig. 1 and 2. The bulb shall have capacity of 0.6 to 1.2 ml for pipettes of nominal dilution 1 in 100 and 0.2 to 0.5 ml for pipettes of nominal dilution 1 in 10. The length of each pipette shall be 120 mm nominal. The shape and dimensions shall be as shown in Fig. 1 and 2. Mouth piece and tubing, if provided, shall be as per Fig. 3.

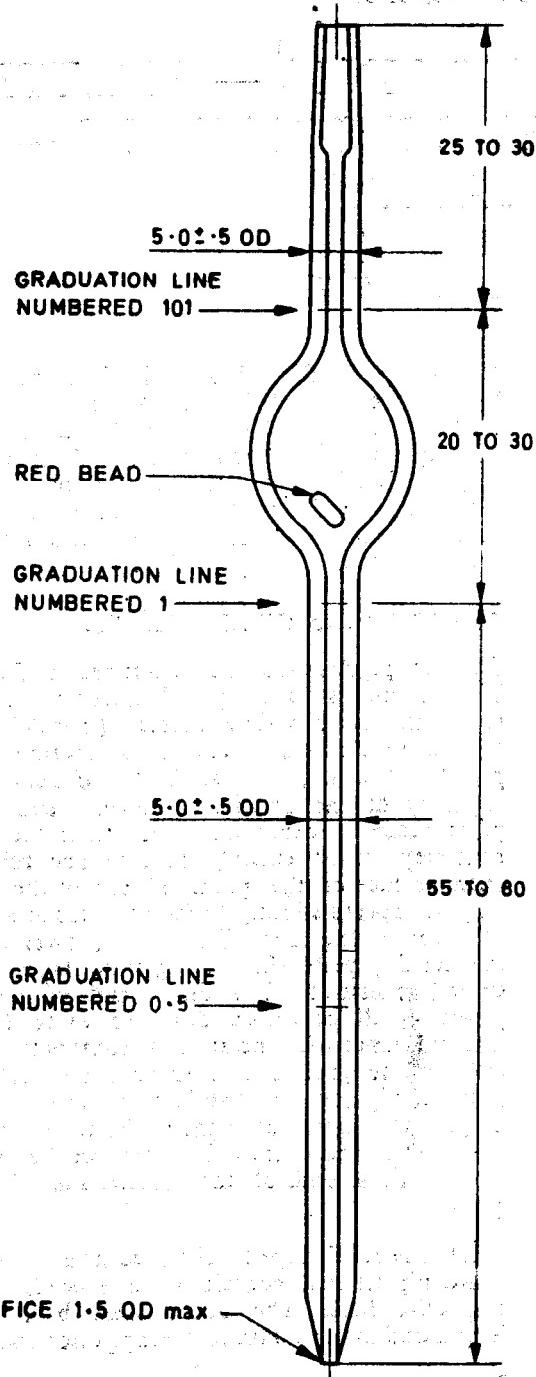
6 WORKMANSHIP AND FINISH

6.1 The pipettes shall be well-annealed, free from bubbles and, as far as possible, free from striae, stones and other visible defects (for definitions, see IS 1382 : 1981). The cross section of the pipette at any point shall be circular. The capillary at the proximal (upper) end of the pipette may be expanded as shown in the figure, or it may consist entirely of capillary tube. The outer surface of the proximal end of the pipette may be tapered slightly to facilitate the attachment of a connecting tube. The distal (lower) end of the RBC pipette shall be ground tapered and smooth polished. The distal end of the RBC pipette shall be drawn down so as to form an internal taper with no sudden constriction. The end shall be ground and smooth polished. For both the pipettes the distal end of the taper shall be ground smooth at right angles to the axis of the pipette and slightly bevelled on the outside. The proximal ends of the pipettes shall be flame polished.

6.1.1 The RBC pipette shall contain a red and WBC pipette shall contain a white bead, in their respective bulbs. The beads shall be 3 mm in length and about 2 mm in average thickness.

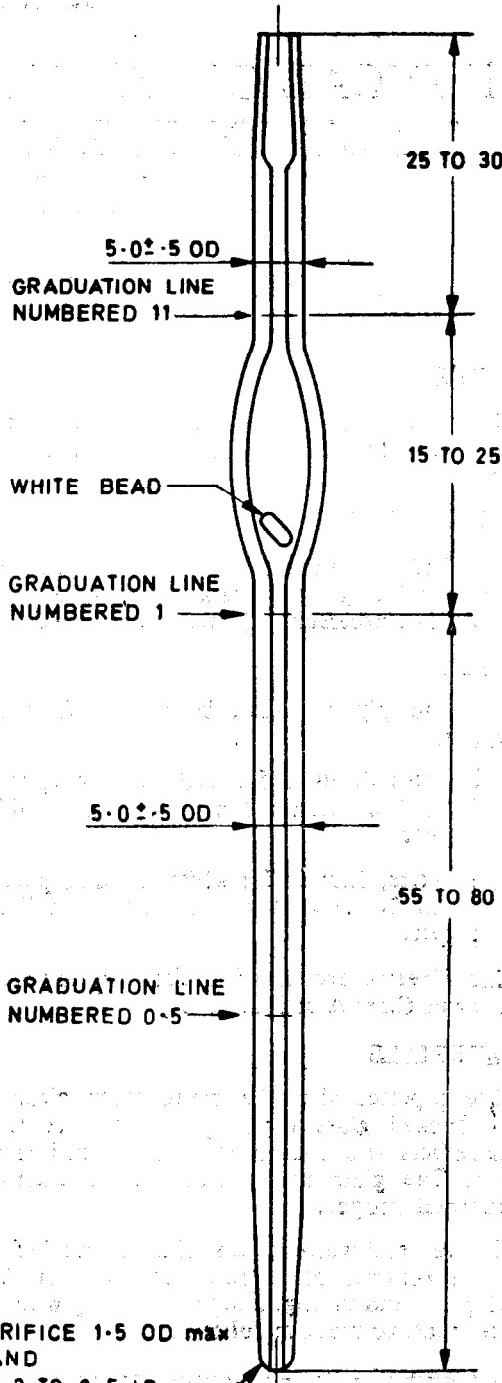
7 GRADUATIONS

7.1 All graduation lines shall be fine, clean, permanent and of uniform thickness. They shall be parallel to each other and at right angles to the axis of the pipette. Each graduation line shall be at least 5 mm in length. When the pipette is made from enamel backed tubing, the graduation lines shall project equally on either side of the



All dimensions in millimetres.

FIG. 1 HAEMOCYTOMETER PIPETTE,
RED BLOOD CELL, 1 IN 100 DILUTION



All dimensions in millimetres.

FIG. 2 HAEMOCYTOMETER PIPETTE,
WHITE BLOOD CELL, 1 IN 10 DILUTION

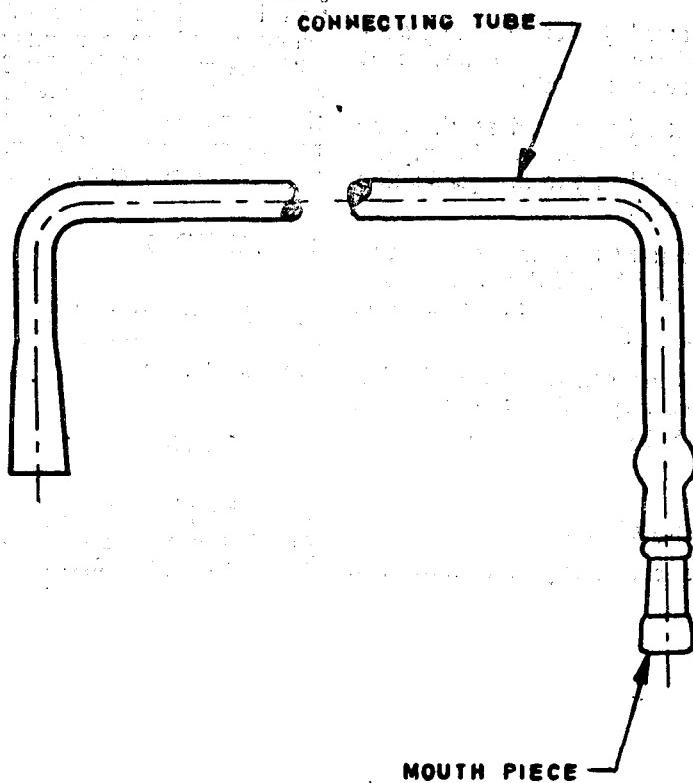


FIG. 3 MOUTH PIECE AND CONNECTING TUBE FOR PIPETTES, DILUTION FOR HAEMOCYTOMETERS

bore, when the pipette is held with the enamel back symmetrically behind the bore. Three graduation lines shall be permanently marked on each pipette as shown in Fig. 1 and 2 as given below:

- Graduation mark '101' on the pipettes for nominal dilution of 1 to 100, and '11' on the pipettes for nominal dilution of 1 in 10, shall be marked on the capillary above the bulb about 4 mm away from the nearer end of the bulb.
- Graduation mark '1' on both types of pipettes shall be marked on the capillary below the bulb about 5 mm from the nearer end of the bulb.
- Graduation mark '0.5' on both types of pipettes shall indicate the volume of water filled from the lower tip of the pipette of this mark. The volume contained below '0.5' mark shall be one half the volume of water contained in the pipette from the lower tip of the pipette to the graduation marking '1' within the permissible limits given in Table 1.

Table 1 Dilution Ratios and Limits

[*Clauses 7.1 (c) and 8.3*]

Type of Pipettes	Dilution Ratio $\frac{v}{v_1}$		Dilution Ratio $\frac{v}{v_2}$	
	Class A	Class B	Class A	Class B
RBC Pipettes	100 ± 1.5	100 ± 3	200 ± 3	200 ± 6
WBC Pipettes	10 ± 0.15	10 ± 0.3	20 ± 0.3	20 ± 0.6

7.2 The graduations of the pipette shall pass the permanency test as specified in 9.1.

8 DILUTION RATIOS AND LIMITS

8.1 The volume held up to any graduation line shall be measured with the lowest point of the water maniscus coinciding the horizontal plane passing through top edge of the graduation line.

8.2 The dilution ratio is defined by the expression

$$\frac{V}{v_1} \text{ and } \frac{V}{v_2}$$

where

V = volume of water held between the graduation line above the bulb and that immediately below the bulb.

v_1 = volume of water (measured at the same temperature as V) held by the pipette from the tip of the jet to the graduation line numbered '1'.

v_2 = volume of water (measured at the same temperature as V) held by the pipette from the tip of the jet to the graduation line numbered '0.5'.

8.3 The pipettes shall be constructed such that their dilution ratios corresponding to each Class of accuracy shall be as specified in Table 1.

9 TEST

9.1 Test for Permanency of Marking

The pipette shall be completely immersed in a

glass cylinder containing hydrochloric acid solution in distilled water of 0.01 normality. The cylinder and the contents shall be autoclaved at 98.1 kN/m² at 120°C for 30 minutes. The autoclaving shall be repeated after allowing sufficient time for the cylinder and its contents to come to room temperature. The markings shall not show appreciable reduction in intensity.

10 MARKING

10.1 The pipettes shall be marked with the indication of source of manufacture and class of accuracy 'A' or 'B'.

11 PACKING

11.1 The pipettes shall be packed in accordance with the prevailing trade practices or as agreed to between the purchaser and the supplier.

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BUREAU OF INDIAN STANDARDS

Headquarters :

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones : 331 01 31, 331 13 75

Telegrams : Manaksanstha
(Common to all Offices)

Regional Offices :

Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110002	Telephone 331 01 31 331 13 75
Eastern : 1/14 C. I. T. Scheme VII M, V. I. P. Road, Maniktola CALCUTTA 700054	37 86 62
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